HUAWEI

Quidway S3526 Ethernet Switch
Installation Manual

VRP3.10

Quidway S3526 Ethernet Switch

Installation Manual

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About This Manual

Release Notes

The corresponding product version of this manual is VRP3.10.

Related Manuals

The related manuals are listed in the following table.

Manual	Content
Quidway S3500 Series Ethernet Switches Operation Manual	Introduces such modules as getting started, port, VLAN, network protocols, multicast protocols, Routing protocols, QoS/ACL, integrated management, 801.x, VRRP, and system management.
Quidway S3500 Series Ethernet Switches Command Manual	Introduces the commands of such modules as getting started, port, VLAN, network protocols, multicast protocols, Routing protocols, QoS/ACL, integrated management, 801.x, VRRP, and system management.

Organization

Quidway S3526 Ethernet Switch Installation Manual mainly introduces the hardware features, installation, configuration and maintenance of S3526. To avoid any possible device damage and personal injury before the installation and during the installation, please read the manual carefully. The manual consists of the following chapters.

- Chapter 1 Overview

The chapter introduces the characteristics of S3526 and its application in the networking.

- Chapter 2 Specifications and Features

The chapter introduces the appearance, the system feature and service feature of S3526.

- Chapter 3 Installation Preparation

The chapter introduces such topics as the environmental requirements of S3526, the instructions for the installation, the installation tools and so on.

- Chapter 4 Installation

The chapter introduces the installation of the S3526, module installation, connections of the power cable, grounding wire and the console cable.

- Chapter 5 Booting and Configuration

The chapter introduces the booting process of S3526, including the power-on booting of the switch and the system initialization.

- Chapter 6 BootROM and Host Software Loading

The chapter introduces several means to upgrade the software of S3526.

- Chapter 7 Troubleshooting

The chapter introduces the problems that might occur during the installation and the booting of S3526 and the respective solution.

- Chapter 8 Optional Interface Modules

The chapter introduces the interface modules supported by S3526.

- Appendix A Knowledge of Optical Fiber

The appendix introduces the general information of optical fiber, including the fiber classification and the optical fiber connectors.

- Appendix B RJ-45 Connector

The appendix introduces the general information of RJ-45 connector.

- Appendix C Lightning Protection of Switches

The appendix introduces lightning protection of switches.

Intended Audience

The manual is intended for the following readers:

- Network engineers
- Network administrators
- Customers who are familiar with network fundamentals

Conventions

The manual uses the following conventions:

I. General conventions

Convention	Description
Arial	Normal paragraphs are in Arial.
Arial Narrow	Warnings, Cautions, Notes and Tips are in Arial Narrow.

Convention	Description
Boldface	Headings are in **Boldface**.
`Courier New`	Terminal Display is in `Courier New`.

II. Command conventions

Convention	Description
Boldface	The keywords of a command line are in **Boldface**.
italic	Command arguments are in *italic*.
[ ]	Items (keywords or arguments) in square brackets [ ] are optional.
{ x | y | ... }	Alternative items are grouped in braces and separated by vertical bars. One is selected.
[x | y | ...]	Optional alternative items are grouped in square brackets and separated by vertical bars. One or none is selected.
{ x | y | ... }*	Alternative items are grouped in braces and separated by vertical bars. A minimum of one or a maximum of all can be selected.
[x | y | ...]*	Optional alternative items are grouped in square brackets and separated by vertical bars. Many or none can be selected.

III. GUI conventions

Convention	Description
< >	Button names are inside angle brackets. For example, click the <OK> button.
[ ]	Window names, menu items, data table and field names are inside square brackets. For example, pop up the [New User] window.
/	Multi-level menus are separated by forward slashes. For example, [File/Create/Folder].

IV. Keyboard operation

Format	Description
<Key>	Press the key with the key name inside angle brackets. For example, <Enter>, <Tab>, <Backspace>, or <A>.
<Key1+Key2>	Press the keys concurrently. For example, <Ctrl+Alt+A> means the three keys should be pressed concurrently.
<Key1, Key2>	Press the keys in turn. For example, <Alt, A> means the two keys should be pressed in turn.

V. Mouse operation

Action	Description
Click	Press the left button or right button quickly (left button by default).
Double Click	Press the left button twice continuously and quickly.
Drag	Press and hold the left button and drag it to a certain position.

VI. Symbols

Eye-catching symbols are also used in the manual to highlight the points worthy of special attention during the operation. They are defined as follows:

⚠ **Caution**, **Warning**, **Danger**: Means reader be extremely careful during the operation.

🕮 **Note**, **Comment**, **Tip**, **Knowhow**, **Thought**: Means a complementary description.

Environmental Protection

This product has been designed to comply with the requirements on environmental protection. For the proper storage, use and disposal of this product, national laws and regulations must be observed.

Table of Contents

Chapter 1 Overview 1-1
1.1 Brief Introduction to S3526 Switch 1-1
1.2 Typical Application of S3526 Switch 1-1
1.2.1 Networking of Ethernet Access in Broadband Residential Quarter 1-1
1.2.2 Networking of VDSL Access in Broadband Residential Quarter 1-2
1.2.3 Networking of Medium and Small-Sized Enterprises & Branches of Large Enterprises 1-3
1.2.4 Networking of Large Enterprise and Campus 1-4

Chapter 2 Specifications and Features 2-1
2.1 S3526 Switch 2-1
2.2 Front Panel of S3526 Switch 2-1
2.2.1 Front Panel 2-1
2.2.2 Ethernet Interface 2-2
2.2.3 Console Port 2-2
2.3 Rear Panel of S3526 Switch 2-3
2.3.1 Rear Panel of AC Chassis 2-3
2.3.2 Rear Panel of DC Chassis 2-3
2.3.3 Optional Interface Module 2-4
2.4 System Features of S3526 Switch 2-5

Chapter 3 Installation Preparation 3-1
3.1 Precautions 3-1
3.2 Requirements on Environment 3-1
3.2.1 Temperature/Humidity Requirements 3-1
3.2.2 Cleanness Requirement 3-2
3.2.3 Anti-interference Requirement 3-3
3.2.4 Laser Radiation Avoidance 3-3
3.3 Installation Tools 3-4

Chapter 4 Installation 4-1
4.1 Hardware Installation 4-1
4.1.1 Installing the Switch in 19-inch Standard Cabinet 4-1
4.1.2 Installing the switch on the Workbench 4-2
4.2 Connection of Power Cord and Ground Wire 4-2
4.2.1 AC Power Supply and Power Cords 4-3
4.2.2 DC Power Supply and Power Cords 4-4
4.2.3 Ground Wire 4-5
4.3 Console Cable Connection 4-6

4.3.1 Console Cable 4-6
4.3.2 Connecting Console Cable 4-7
4.4 AUX Cable Connection 4-7
4.4.1 AUX Cable 4-7
4.4.2 Connecting AUX Cable 4-8
4.5 Installation of the Optional Interface Modules 4-8
4.6 Post-installation Checklist 4-8

Chapter 5 Booting and Configuration 5-1
5.1 Setting Up Configuration Environment 5-1
5.2 Connecting the Console Cable 5-1
5.3 Setting Parameters of the Terminal 5-1
5.4 Booting S3526 Switch 5-5
5.4.1 Check before Powering on the Switch 5-5
5.4.2 Power on the Switch 5-6

Chapter 6 BootROM and Host Software Loading 6-1
6.1 Introduction to Loading Approaches 6-1
6.2 Local Software Loading 6-1
6.2.1 Boot Menu 6-2
6.2.2 Loading Software from Console Port Using XModem 6-3
6.2.3 Loading Software from Ethernet Port Using TFTP 6-8
6.2.4 Loading Software from Ethernet Port Using FTP 6-9
6.3 Remote Software Loading 6-11
6.3.1 Remote Loading Using FTP 6-11
6.3.2 Remote Loading Using TFTP 6-12
6.4 Dealing with Load Failure 6-12
6.5 Dealing with Missing of Password 6-13

Chapter 7 Troubleshooting 7-1
7.1 Power System Failure 7-1
7.2 Configuration System Failure 7-1

Chapter 8 Optional Interface Modules 8-1
8.1 Types of Optional Interface Modules 8-1
8.2 Installation of the Optional Modules 8-1
8.3 1000Base-SX/LX Module 8-3
8.3.1 Introduction 8-3
8.3.2 Appearance 8-3
8.3.3 Module Panel and the Indicators 8-4
8.4 1000Base-T Module 8-4
8.4.1 Introduction 8-4
8.4.2 Appearance 8-5
8.4.3 Module Panel and the Indicators 8-5
8.5 1000Base-ZX Module 8-6

8.5.1 Introduction 8-6
8.5.2 Appearance 8-6
8.5.3 Module Panel and the Indicators 8-7
8.6 1000Base-LX GL Module 8-7
8.6.1 Introduction 8-7
8.6.2 Appearance 8-7
8.6.3 Module Panel and the Indicators 8-8
8.7 Stack Module 8-8
8.7.1 Introduction 8-8
8.7.2 Appearance 8-9
8.7.3 Module Panel and the Indicators 8-9
8.7.4 Connection of Module Interface Cable 8-10

Appendix A Knowledge of Optical Fiber A-1
A.1 Multi-mode Optical Fiber and Single Mode Optical Fiber A-1
A.2 Optical Fiber Connector A-1

Appendix B RJ-45 Connector B-1

Appendix C Lightning Protection of Switches C-1
C.1 Installation of Lightning Arrester for Power (Socket Strip with Lightning Protection) C-1
C.2 Installation of Lightning Arrester for Network Port C-2

Chapter 1 Overview

1.1 Brief Introduction to S3526 Switch

Quidway S3526 Ethernet Switch is a layer-2/layer-3 wire-speed Ethernet switching product delivered by Huawei Technologies Co., Ltd. (hereafter referred to as Huawei). The switch is of modular design and supports stacking. Based on the VRP (Versatile Routing Platform) network operating system over which Huawei has independent intellectual proprietary, Quidway S3526 Ethernet switch can deliver rich routing protocols, VLAN control, traffic switching, and QoS assurance. The switches provide matured service control and user management capability.

According to different power supplies, S3526 Ethernet Switch is equipped with two kinds of chassises, i.e. DC chassis and AC chassis, which have dissimilar power input sockets.

The switch can be used in the networking of enterprise network, IP MAN (Metropolitan Area Network) and residential quarter.

The services supported by Quidway S3526 Ethernet Switch include:

- Internet broadband access
- Networking of enterprise network and campus network
- Multicast service and multicast routing functions. Supports multicast Audio/Video services and VOD services.

1.2 Typical Application of S3526 Switch

The networking of S3526 switches is very flexible. The switch can either be used in the enterprise network or in the broadband access. Some typical networking modes are described in the following sections.

1.2.1 Networking of Ethernet Access in Broadband Residential Quarter

In the networking of broadband residential quarter access, S3526 Ethernet switch is located in the center of the residential quarter. In the downstream direction, the switch is connected to Ethernet users via Quidway S2403 or Quidway S3026 Ethernet Switch. In the upstream direction, the switch is connected to the core layer-3 switch via the GE expansion module slot, and then to the MAN backbone.

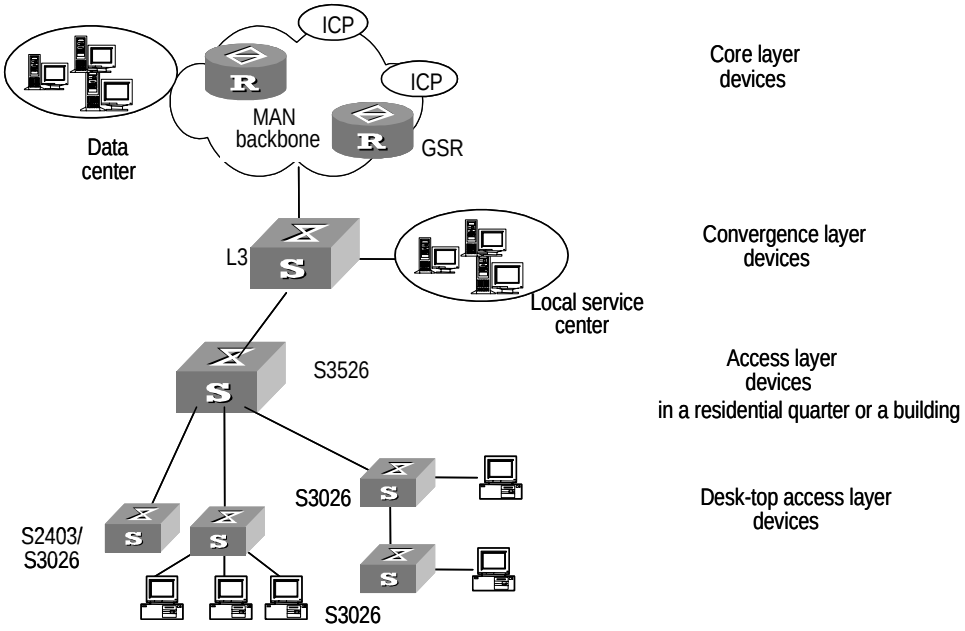


Figure 1-1 Networking of Ethernet access

1.2.2 Networking of VDSL Access in Broadband Residential Quarter

In the networking application of a broadband residential quarter, S3526 Ethernet Switch can be downstream connected to VDSL users via S3026V switch and can be upstream connected to core layer-3 switches of the MAN backbone via GE expansion module slots.

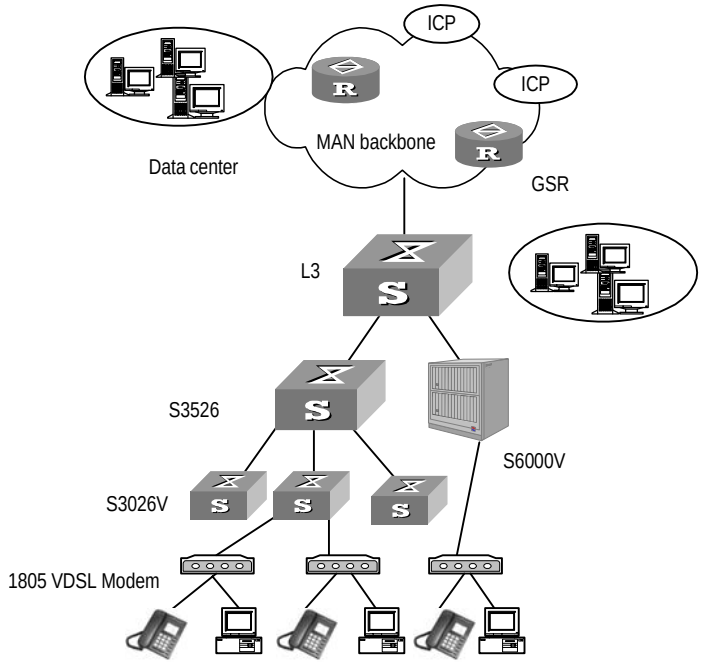


Figure 1-2 Networking of VDSL access

1.2.3 Networking of Medium and Small-Sized Enterprises & Branches of Large Enterprises

In medium and small-sized enterprises and the branches of large enterprises, S3526 switch can be used as backbone switch and connected to the headquarters or the network of other branches via the routers. When the scale of the enterprise expands, S3526 switches can be used in the cascade mode to scale up the backbone network.

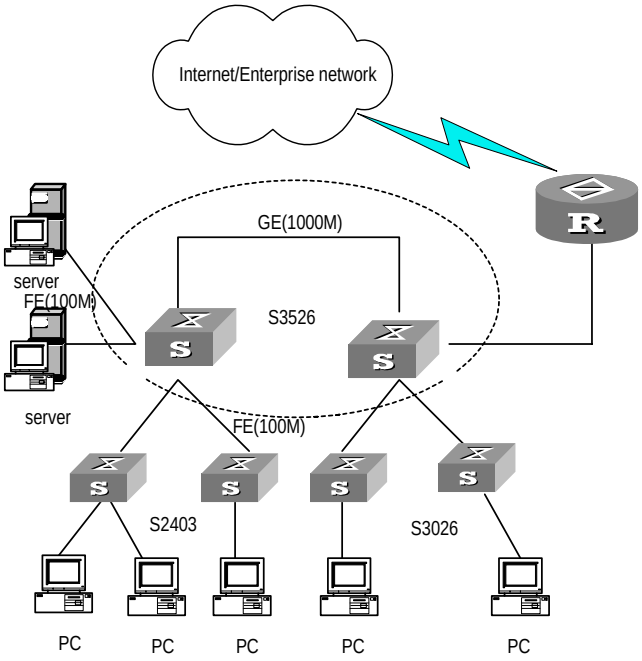


Figure 1-3 Networking of medium and small-sized enterprises and the branches of large enterprises

1.2.4 Networking of Large Enterprise and Campus

In large-scale enterprise network and the campus network, S3526 are located in the convergence layer, attached with several layer-2 Ethernet switches such as Quidway S3026 Ethernet Switch. In the upstream direction, S3526 switches are connected to the core layer-3 switches via the GE expansion module slots. Thereby, it offers a complete enterprise networking solution, which provides 1000M bandwidth to backbone network and 100M bandwidth to desktop users

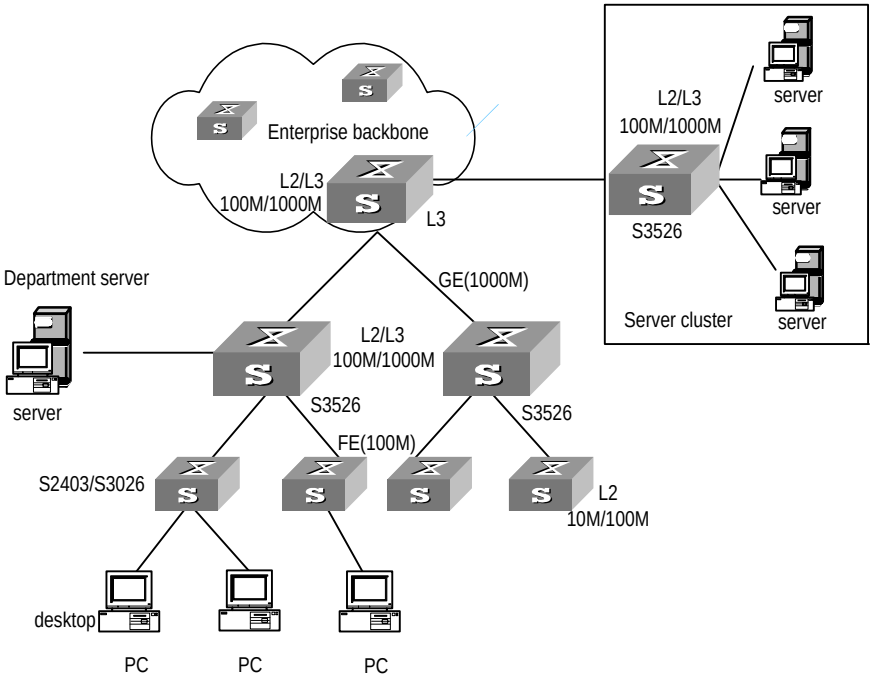


Figure 1-4 Networking of large enterprise network and campus network

Chapter 2 Specifications and Features

2.1 S3526 Switch

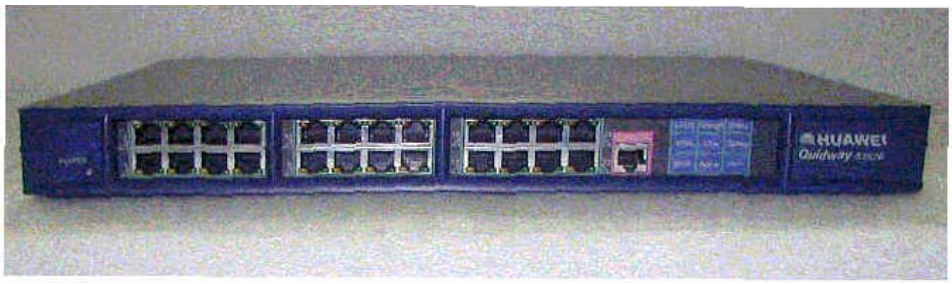


Figure 2-1 S3526 Ethernet Switch

2.2 Front Panel of S3526 Switch

Note:

The DC chassis and AC chassis have the same front panel.

2.2.1 Front Panel

As illustrated in the following figure, there are, from left to right, the power indicator, 24 fixed 10Base-T/100Base-TX Ethernet interfaces and a Console port on the front panel of S3526 switch.

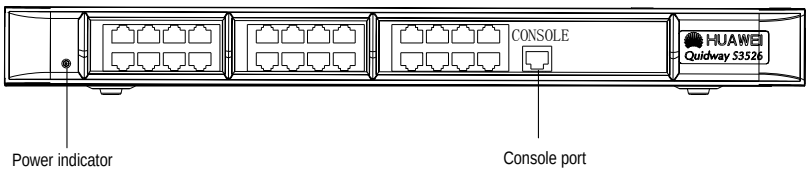


Figure 2-2 Front panel of S3526 Ethernet Switch

The meaning of the indicators on the front panel of S3526 Ethernet Switch is described in the following table.

Table 2-1 Front panel indicators of S3526 Ethernet Switch

Indicator	Panel indication	Status	Description
Power indicator	POWER	On	The switch is powered on.
		Off	The switch is powered off.
10Base-T/100Base-TX	Link/Active (Orange)	On	The connection is normal.
		Off	No connection is being made.
		Blinking	The data is being sent or received.
	Speed (Green)	On	100Base-TX operating mode
		Off	10Base-T operating mode

Note:

The 10Base-T/100Base-TX RJ-45 connector of S3526 Ethernet Switch supports auto sensing of MDI/MDI-X.

2.2.2 Ethernet Interface

The Ethernet interface on the front panel uses the connector with indicators. The connector type is of standard RJ-45. The attributes of the Ethernet interface are listed in the following table.

Table 2-2 Attribute of 10Base-T/100Base-TX interface

Attribute	S3526
Type of connector	RJ-45
Number of interfaces	24
Functions	● 100Mbps full duplex ● 10M full duplex ● MDI/MDI-X auto sensing
Cable and transmission distance	Category-5 twisted pair cabling. A maximum transmission distance of 100m is supported.

Note:

For the appearance of RJ-45 connector and relevant description of MDI/MDI-X, see appendix A.

2.2.3 Console Port

S3526 Ethernet Switch provides a console port compliant with EIA/TIA-232 asynchronous serial standard. You can perform the switch configuration via this port.

Table 2-3 Console port attribute

Attribute	Description
Type of connector	RJ-45
Standard of interface	Asynchronous EIA/TIA-232
Baud rate	9600bps (default)
Services supported	● Connected to character terminal ● Connected to the serial port of local PC via Modems and runs the terminal emulation program on the PC

Note:

The baud rate of the Console port can be selected. Please refer to section 6.2.

2.3 Rear Panel of S3526 Switch

2.3.1 Rear Panel of AC Chassis

On the rear panel of S3526's AC chassis, there are: AC power input socket, two optional interface module slots and grounding screw from left to right, as illustrated in the following figure.

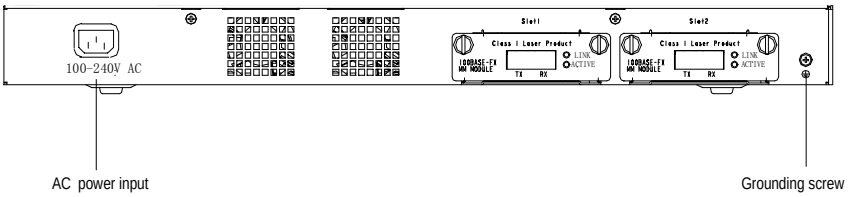


Figure 2-3 Rear panel of S3526 Ethernet Switch AC chassis

2.3.2 Rear Panel of DC Chassis

On the rear panel of S3526's DC chassis, there are: DC power input socket, two optional interface module slots and grounding screw from left to right, as illustrated in the following figure.

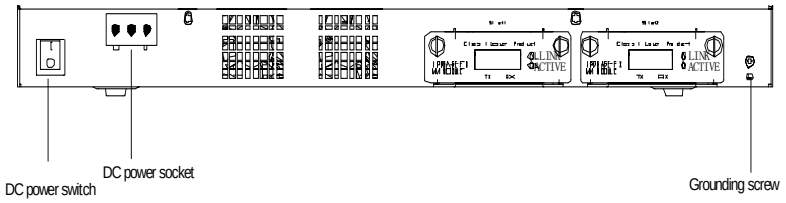


Figure 2-4 Rear panel of S3526 Ethernet Switch DC chassis

2.3.3 Optional Interface Module

The types of the optional interface modules supported by S3526 Ethernet Switch are listed in the following.

- 1000Base-SX module
- 1000Base-LX module
- 1000Base-T module
- 1000Base-ZX module (70km)
- 1000Base-LX GL module (40km)
- Stack module

For detailed features of each module, please refer to Chapter 8.

2.4 System Features of S3526 Switch

Table 2-4 System features of S3526 switch

Item	S3526 switch
Processor	MPC8240 200MHz
BOOT ROM	512KB
SDRAM	64MB(default)
Flash	8MB
Size (W x H x D)	436mm x 42mm x 338mm
Weight	4kg
Input voltage	AC: Rated voltage: 100 - 240V ; 50/60Hz Maximum voltage:90-264V.;50/60Hz
	DC: Rated voltage: -60- -48V Maximum voltage:-72- -36V
Max. power	40W
Port	Fixed port: twenty-four 10Base-T/100Base-TX ports
	Two interface module slots. The types of optional interface modules include: ● 1000Base-T module ● 1000Base-LX module ● 1000Base-SX module ● 1000Base-ZX module (70km) ● 1000Base-LX GL module (40km) ● stack module
Switching mode	Store and forward
Switching capacity	12.8Gbps
Packet processing capability	6.55Mpps
MAC address aging time	5 minutes (default)
VLAN	Supports 4k port-based VLANs compliant with IEEE 802.1Q standard
MAC address list	Supports up to 16K MAC addresses and 16K IP addresses
Buffer size	4MB
Flow Control	● Supports IEEE 802.3x flow control (full duplex) ● Back-pressure based flow control (half-duplex)
Operating temperature	0°C to 45°C
Operating humidity (non-condensing)	10% to 90%

Note:

For the related descriptions and the implementation of the service features of S3526 Switch, please refer to *Quidway S3500 Series Ethernet Switches Operation Manual*

Chapter 3 Installation Preparation

3.1 Precautions

To avoid any device impairment and bodily injury because of improper use, please follow the precautions listed below:

- Before cleaning the switch, please unplug the switch connector first. Do not clean the switch with wet cloth or with liquid.
- Do not place the switch near water or any damp area. Prevent water or moisture from entering the switch chassis.
- Do not place the switch on the unstable cases or desktop, as the switch might be damaged severely in case of a fall.
- Ensure proper ventilation of the room and keep the switch ventilation hole free of obstruction.
- The switch can operate normally under correct voltage input. Make sure that the operating voltage is consistent with that labeled on the switch.
- Do not open the chassis while the switch is in operation to protect the safe of the operator and the switch.

3.2 Requirements on Environment

S3526 Ethernet Switch should be used indoors. The following requirements must be met irrespective of whether you install the switch in 19-inch standard cabinet or install it directly on the workbench.

- Make sure that enough room is left for the air-intake hole and the ventilation hole of the switch, so that the heat dissipation of the switch chassis can be guaranteed.
- Make sure that the ventilation and heat dissipation systems of the cabinet and the workbench are good.
- Make sure that the cabinet and the workbench are stable enough to bear the weight of the switch and the accessories.
- Make sure that the rack and the workbench are well grounded.

To ensure normal operation and to prolong the life span of the switch, the following requirements on the installation site must also be met.

3.2.1 Temperature/Humidity Requirements

To ensure the normal operation and service life of a switch, users need to maintain the temperature and the humidity of the equipment room at a certain level. If the humidity

level in the equipment room is too high for a long time, it will lead to bad insulation of the insulating material or even leakage. Sometimes, the mechanical performance, changes of material, the rustiness and corrosion of some metal parts are also likely to occur. If the relative humidity is too low, the captive screws may become loose due to the shrinking of insulation washers. Meanwhile, the electrostatic is likely to be produced in the dry weather environment, which will jeopardize the CMOS circuit of the switch. Higher the temperature, the greater will be the damage caused to the switch. High temperature for a long time will speed up the aging process of the insulation materials, greatly lower the reliability of the switch and therefore affect its life span seriously.

3.2.2 Cleanness Requirement

Dust will hazard safe operation of the equipment. Falling on the equipment, it may cause electrostatic adsorption, and hence result in poor contact of the metal connectors or connection points. This is more likely to happen when the relative indoor humidity is low, which will not only shorten the router's service life, but also incur communication failures.

The requirements on dust content and particle diameter in the equipment room are shown in the following Table.

Table 3-1 Specification on dust content in an equipment room

Maximum diameter (μm)	0.5	1	3	5
Maximum intensity (particles per cubic meter)	1.4×10^7	7×10^5	2.4×10^5	1.3×10^5

Besides the requirements on dust, rigorous requirements are also set on the air content of salts, acids, and sulfides in an equipment room. These harmful gases will accelerate metal corrosion and aging process of certain parts. The equipment room should be protected from harmful gases such as SO_2, H_2S, NO_2, NH_3 and Cl_2, the value limits of which are shown in the following Table.

Table 3-2 Value limits for harmful gas contents in an equipment room

Gas	Average (mg/m^3)	Maximum (mg/m^3)
SO_2	0.2	1.5
H_2S	0	0.03
NO_2	0.04	0.15
NH_3	0.05	0.15
Cl_2	0.01	0.3

3.2.3 Anti-interference Requirement

A switch in use may be affected by the interference sources outside the system in a way of capacitance coupling, inductance coupling, radiation of electromagnetic wave, common impedance (including the grounding system) or conducting line (power line, signaling line and transmission line etc.). Therefore, the following should be considered:

- If AC supply system is TN system, AC power socket should be a single-phase three-line power socket with PE (Protection Earth). Thereby, the filter circuit in the equipment can effectively filter interference from the power supply system.
- Keep the switch far away from radio launcher, radar launcher, and high-frequency devices working in high currents.
- Adopt the measure of electromagnetic shielding if necessary. For example, you can adopt shielded interface cable.
- Interface cable must be run indoors, and outdoor cabling is not permitted, in case that overvoltage and overcurrent damage the device.

Caution:

If the cable has to be run outdoors, please select proper lightning arrester. Refer to the appendix for the description of arrester installation.

3.2.4 Laser Radiation Avoidance

In operating status, it is prohibited to stare into the open optical interface because the laser being transmitted through the optical fiber will produces a small beam of light, it has very high power density and is invisible to human eyes, when a beam of light enters the eye, retinal may be burned.

Warning:

Staring at the laser beam inside the fiber could hurt your eyes.

3.3 Installation Tools

- Phillips screwdriver
- Flat-blade screwdriver
- ESD-preventive wrist strap

Note:

The installation tools are not shipped with S3526 switch. You must ensure the availability of required tools beforehand.

Chapter 4 Installation

Note:

On the installation screw of Quidway switches' chassis, there is an anti-dismantle seal of Huawei Technologies Co., Ltd. The seal must be kept intact before the sales agent performs maintenance to the switch. Therefore, users should contact local agent for permission if it is necessary to open the chassis, otherwise, users should bear the responsibility for possible damages.

4.1 Hardware Installation

4.1.1 Installing the Switch in 19-inch Standard Cabinet

The installation procedures are described in the following sections:

Step 1: Check grounding and stability of the cabinet. Fix the angle iron at both sides of the front panel of the switch with screws.

Step 2: Place the switch on a shelf in the cabinet. Depending on the actual situation, slide the switch along the guides of the cabinet to an appropriate position. Ensure there is proper room between the switch and the guides.

Step 3: Use screws to fix the angle irons on the fixing guides at both sides of the cabinet. Make sure that the switch is securely fixed in the cabinet by the shelf on each slot and the angle irons.

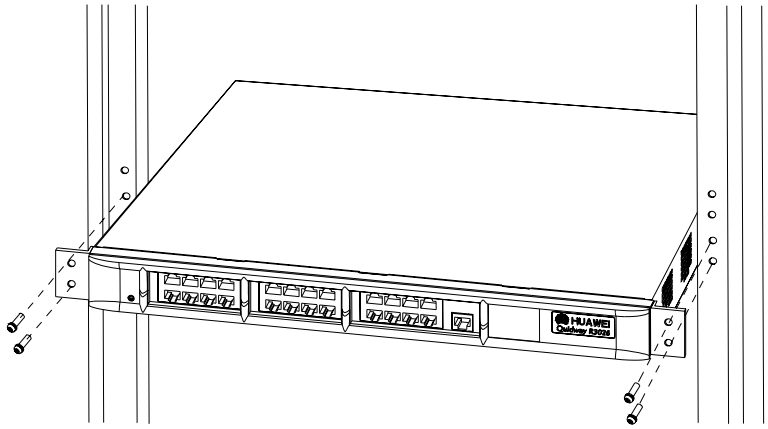


Figure 4-1 S3526 Ethernet Switch Installation (mount in a cabinet)

Note:

The angle iron is used for fixing rather than bearing. When the switch is mounted on a 19-inch standard cabinet, it should be borne by rails (fixed on the cabinet).

4.1.2 Installing the switch on the Workbench

If 19-inch standard cabinet is not available, you may place the switch on a clean workbench. You need to pay attention to the following during such operation:

- Make sure that the workbench is secure and well grounded.
- Leave about 10 centimeters of space around the switch for heat dissipation.
- Do not place heavy objects on top of the switch.

4.2 Connection of Power Cord and Ground Wire

S3526 Ethernet Switch supports two types of power modules, i.e. AC power module and DC power module. Users can purchase the power module in accordance with their actual environment. The only difference between the switches equipped with AC power module and those equipped with DC power module lies in that the input voltage of the two modules is different.

4.2.1 AC Power Supply and Power Cords

I. AC power

Caution:

If an outdoor AC power cord should be directly led to the switch, please serially connect the lightning arrester for AC Power (Socket Strip with Lightning Protection) before you plug AC power cord into the switch, thus to prevent the possible damage to the switch due to lightning strike. Refer to the section "Installation of Power Lightning Arrester" in the appendix.

Rated voltage: 100-240V a.c.; 50/60Hz

Maximum voltage:90-264V a.c.; 50/60Hz

See the AC power source in the following figure.

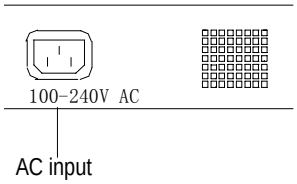


Figure 4-2 Partial look of the switch power socket (AC power)

Note:

S3526 Ethernet Switch with AC power input has no power switch on its panel.

II. Recommended AC power socket

A monophase 3-wire power socket with a neutral point connector, or a multi-functional power socket for the computer is recommended. The neutral point of the power in a building must be reliably grounded. Normally, the neutral point of the power supply system in a building is buried in the ground during the construction and wiring. The user must make sure that the power supply for the building is grounded.

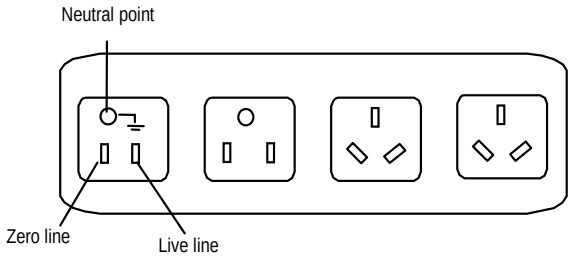


Figure 4-3 Recommended AC power socket

III. Connecting AC power cord

Step 1: Connect one end of the ground wire of the chassis that is shipped with the switch to the grounding screw on the switch rear panel, and properly ground the other end as near as possible.

Step 2: Connect one end of the power cord that is shipped with the switch to the power socket on the rear panel of the switch chassis, and connect the other end to AC power socket.

Step 3: Check whether the power indicator on the front panel of the switch is on. If it is on, it indicates that the power cords are correctly connected.

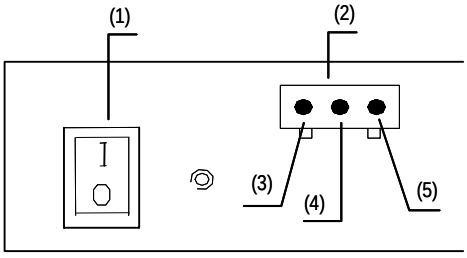
4.2.2 DC Power Supply and Power Cords

I. DC power

Rated voltage: -60- -48V d.c.

Maximum voltage:-72- -36V d.c.

DC power input socket is illustrated in the following figure.



(1): Power Switch (2): DC input (3): BGND, -48V working ground
(4):-48V (5):PGND, protection ground

Figure 4-4 Partial appearance of the power socket (DC power)

Note:

S3526 Ethernet Switch with DC power input has a power switch on its panel.

II. Connecting DC power cord

Step 1: Connect one end of the ground wire of the chassis that is shipped with the switch to the grounding screw on the switch rear panel, and properly ground the other end.

Step 2: Connect one end of the power cord that is shipped with the switch to the power socket on the switch rear panel, and connect the other end to the –48V DC power supply of the switch.

Step 3: Check whether the power indicator in the rear panel of the switch is on. If it is on, it indicates that the power cord is correctly connected.

4.2.3 Ground Wire

Note:

The correct connection of the switch ground wire is the primary guarantee for the lightning protection and anti-interference requirement for a switch; so you should connect the ground wire carefully.

The power input end of S3526 Ethernet Switch is connected with a noise filter unit, whose central ground is directly connected with the chassis, forming the so-called chassis ground (also called the protection ground). This chassis must be well grounded so that the induction power and leakage power can be released to the ground to enhance the switch performance to withstand the electromagnetic interference. The chassis grounding screw is located on the rear panel of the chassis (see the location in the following figure).

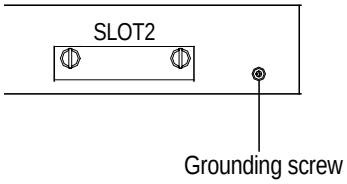


Figure 4-5 Grounding screw of S3526 Ethernet Switch chassis

Connect chassis grounding screw to the ground with a ground wire, and make sure that the ground resistance is not greater than 5ohm. If the switch is installed in a standard 19-inch cabinet, the cabinet should be grounded in the same way.

4.3 Console Cable Connection

4.3.1 Console Cable

The console cable is an 8-core shielded cable. One end of the cable is a crimped RJ-45 connector, which is to be plugged into the console port of the switch. The other end is furnished with a DB-9-pin connector and a DB-25-pin connector. You can select either of them based on your actual requirement to fit in with the 25-pin or 9-pin interface on the configuration terminal. The Console cable is shown in the following figure.

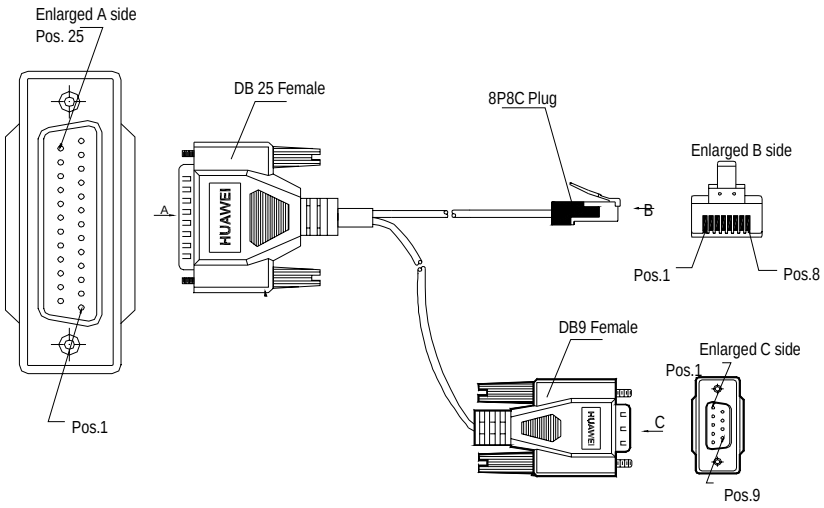


Figure 4-6 Console cable

Table 4-1 Console cable pinouts

RJ-45	Signal	Direction	DB-25	DB-9
1	RTS	<----	4	7
2	DTR	<----	20	4
3	TXD	<----	2	3
4	CD	--->	8	1
5	GND	----	7	5
6	RXD	--->	3	2
7	DSR	--->	6	6
8	CTS	--->	5	8

4.3.2 Connecting Console Cable

While configuring the switch at the configuration terminal, connect the console cable as described below:

Step 1: Plug the console cable's DB-9/25 connector to the serial port of the PC or the terminal where the switch is to be configured.

Step 2: Connect the RJ-45 connector of the console cable to the console of the switch.

⚠ Caution:

When connecting the cables, check the ID on the ports to avoid wrong connection.

🕮 Note:

PC and terminal serial port doesn't support hot swap. When connect the PC and switch, please first plug the DB-9 or DB-25 female plug of the console cable to the serial port of the PC or the terminal, then plug the RJ-45 connector of the console cable to the console port of the switch. When disconnect the PC and switch, please first unplug the RJ-45 connector of the console cable to the console port of the switch, then unplug the DB-9 or DB-25 female plug of the console cable to the serial port of the PC or the terminal.

4.4 AUX Cable Connection

AUX cable is necessary when the S3526 Ethernet Switch perform the remote terminal configuration.

4.4.1 AUX Cable

AUX cable is an 8-core shielded cable. One end of the cable is a RJ-45 connector, which is used to plug into the switch Console. The other end is furnished at the same time with a DB-9-pin connector and a DB-25-pin connector of which users can chose one to plug into the DB-9 or DB-25 socket on the virtual Modem according to the actual needs. The following figure illustrates the AUX cable.

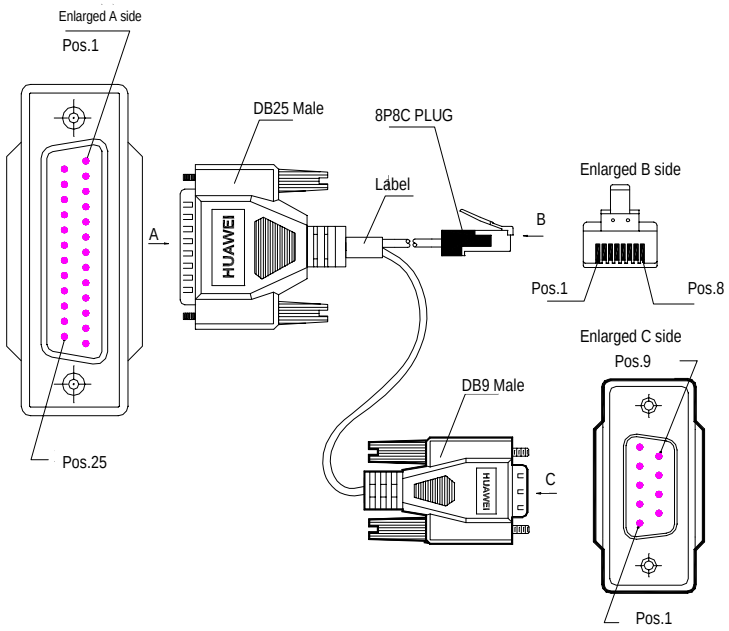


Figure 4-7 AUX cable

Table 4-2 AUX cable pinouts

RJ-45	Signal	Direction	DB-25	DB-9
1	RTS	--->	4	7
2	DTR	--->	20	4
3	TXD	--->	2	3
4	CD	<---	8	1
5	GND	---	7	5
6	RXD	<---	3	2
7	DSR	<---	6	6
8	CTS	<---	5	8

4.4.2 Connecting AUX Cable

Step 1: Plug the RJ-45 end of the AUX cable into the switch Console.

Step 2: Connect the DB-25 (or DB-9) end of the AUX cable into the Modem serial port.

4.5 Installation of the Optional Interface Modules

Refer to Chapter 8 for detailed description.

4.6 Post-installation Checklist

After the installation is completed, check that:

- The power to be used is consistent with that labeled on the switch.
- The ground wire is connected.
- The Console cable and power input cable are connected properly.
- Check if all the interface cabling is performed indoors and there is no outdoor cabling. In the case of outdoor cabling, check if the socket strip with lightning protection and network port lightning arrester have been connected.

Chapter 5 Booting and Configuration

5.1 Setting Up Configuration Environment

The procedures for setting up the configuration environment are described in the following paragraphs (the following figure is given as an illustration):

- Connect S3526 with a configuration terminal (In this case, a PC) with a piece of console cable
- Complete the setting of the terminal communications parameters.

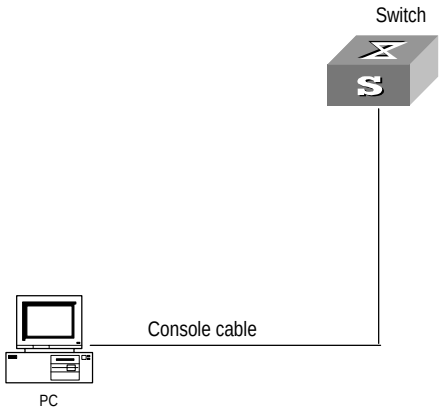


Figure 5-1 Setting up the local terminal configuration environment

5.2 Connecting the Console Cable

Step 1: Plug the DB-9/25 connector of the console cable to the serial interface of the PC or terminal where the switch is to be configured.

Step 2: Connect the RJ-45 connector of the console cable to the console of the switch.

5.3 Setting Parameters of the Terminal

Step 1: Start the PC and run a terminal emulation program such as the Terminal of Windows3.1 or the Hyper Terminal of Windows95/98/NT.

Step 2: Set terminal parameters (taking the hyper terminal parameter settings in Windows98 as example).

Parameter requirements:

Set the baud rate to 9600, the data bits to 8, parity check to none, stop bit to 1, flow control to none, and terminal emulation to VT100. The specific means is as follow:

1) Click [Start/Program/Accessories/Communications/Hyper Terminal] to enter the Hyper Terminal window in which click icon

to establish a new connection and the system will pop up the connection description interface.

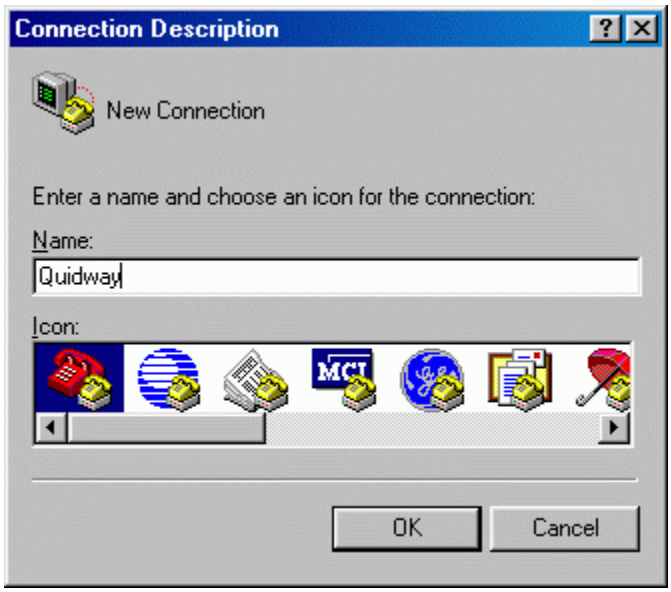


Figure 5-2 Connection description interface of HyperTerminal

2) Key in the name of the new connection in the connection description interface and click <OK>, the system will pop up the following interface picture. Select the serial port to be used from [Connect using].

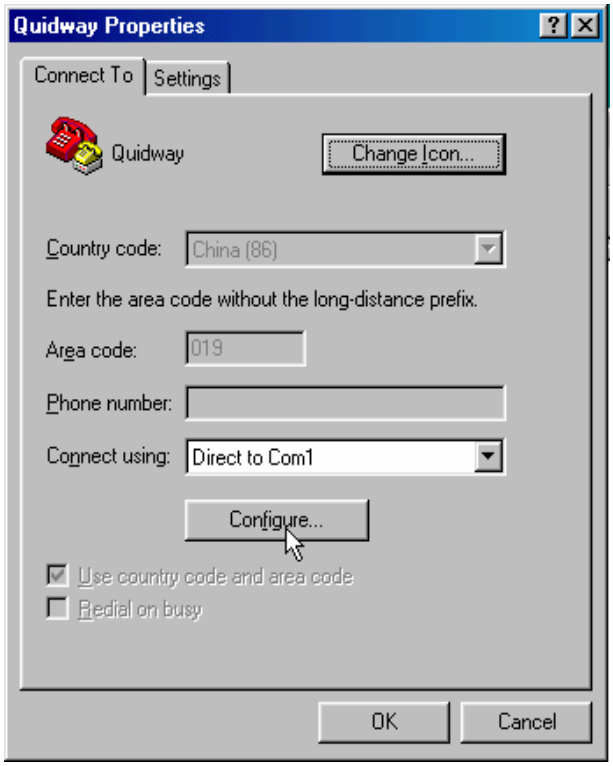


Figure 5-3 Setting the serial port to be used in HyperTerminal connection

3) Click <OK> after the serial port is selected and the system will pop up the following interface. Set the baud rate to 9600, data bit to 8, no parity check, stop bit to 1, and flow control to none.

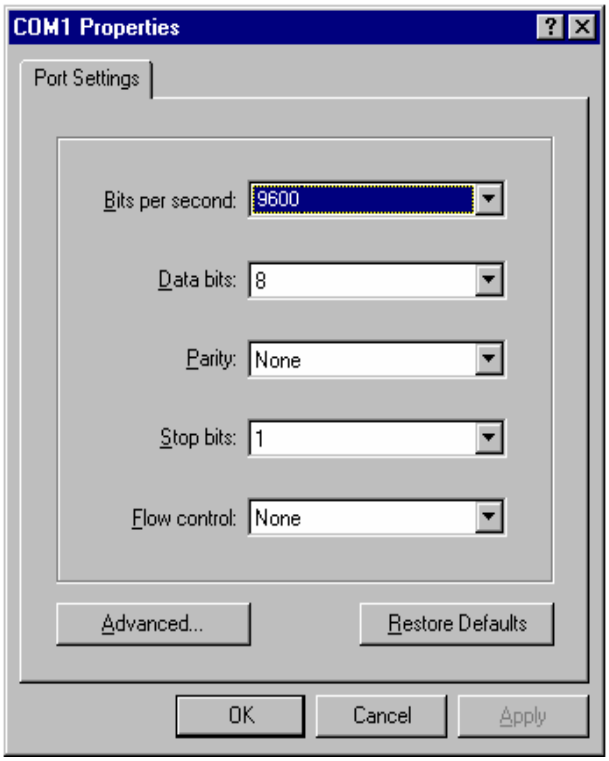


Figure 5-4 Setting serial interface parameters

4) Click <OK> when the serial interface parameters are set and the system will enter the following interface.

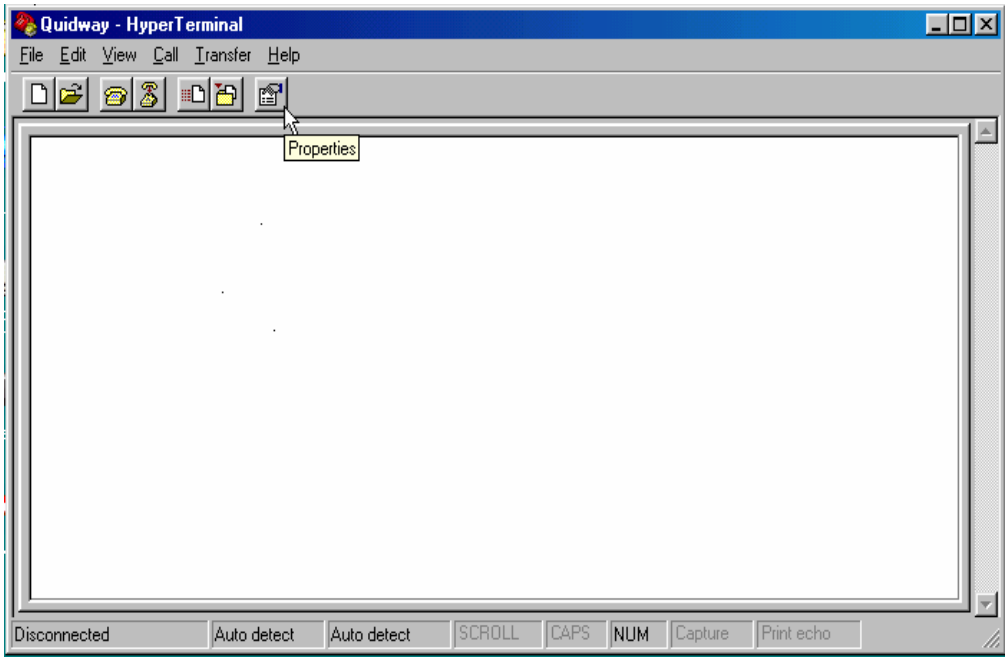


Figure 5-5 HyperTerminal

Select [Properties] in the Hyper Terminal dialog box to enter the property window. Click [Settings] in the property setting window as the following figure and select the emulation terminal to VT100. Click <OK> when the selection is done.

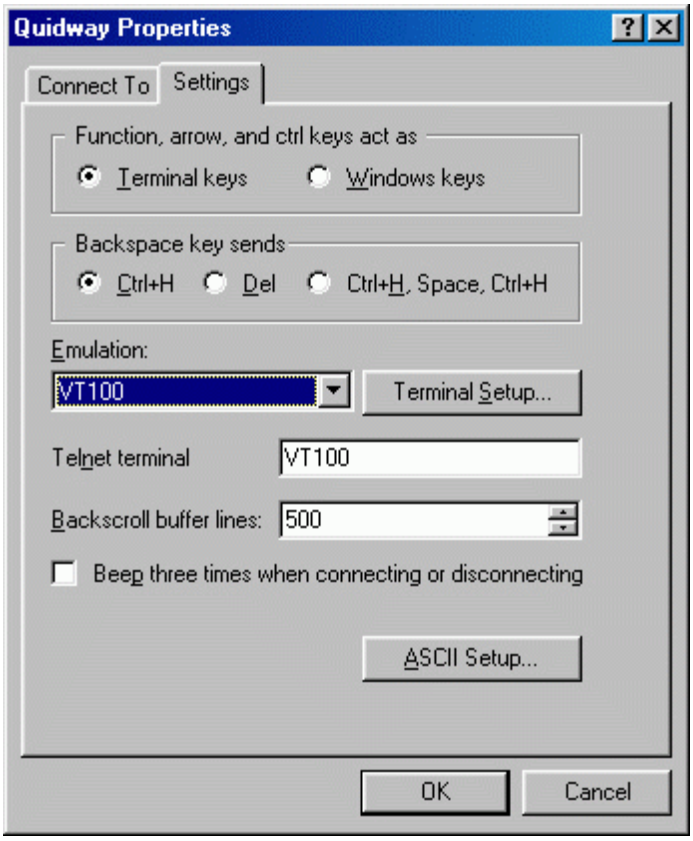


Figure 5-6 Setting the terminal emulation in property setting window

5.4 Booting S3526 Switch

5.4.1 Check before Powering on the Switch

Before powering on S3526 switch, check that:

- The power cords and ground wires are correctly connected.
- The voltage is consistent with that required by the switch.
- The console cable is correctly connected; the PC or the terminal for configuration has been started; and the setting is completed.

5.4.2 Power on the Switch

I. Boot interface

After the switch is powered on, first run the BOOTROM program. The terminal display provides the following output:

```
starting….
            ********************************************
            *                                          *
            *   Quidway S3526 BOOTROM, Version 2.00    *
            *                                          *
            ********************************************
      Copyright(C) 2000-2002 by HUAWEI TECHNOLOGIES CO.,LTD.
      Creation date: Oct 26 2001, 16:57:31
      CPU type        : MPC8240
      CPU Clock Speed : 200Mhz
      BUS Clock Speed : 33Mhz
      Memory Size     : 64MB

S3526R001 main board self testing.....................          (1)
SDRAM fast selftest.....................................OK!  (2)
Please check port leds..............Led selftest finished!  (3)
Flash fast selftest.....................................OK!  (4)
Switch chip selftest....................................OK!  (5)
CPLD selftest...........................................OK!  (6)
Port g2/1 has no module          (7)
Port g1/1 has no module          (8)
PHY selftest............................................OK!  (9)
SSRAM fast selftest.....................................OK!  (10)

Press Ctrl-B to enter Boot Menu... 5  (11)
```

Line (1) to (10) indicates system selftest information, line (7) and (8) may be changed based on different modules.

For the line (11), 5 seconds are kept for the instruction waiting:

- If pressing <Ctrl+B> within the 5 seconds, the program will access the BOOT menu. For specific description, see section 6.1.
- If not performing any operation or press other keys other than <Ctrl+B> within the 5 seconds of waiting, system will enter the auto-booting state when the time prompt for instruction waiting becomes 0.

II. System auto-booting

Note:

System will enter the auto-booting status if no operations are performed or no keys except <Ctrl+B> are keyed in within 5 seconds of appearing " Press Ctrl-B to enter Boot Menu…".

After the auto-booting of the system, the switch will start the decompression:

```
Auto-booting...
Decompress Image. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. . . . . ..OK!
Starting application now......
User interface Aux0/0 is available
Press ENTER to get started.
```

Press <Enter> and the terminal display will give the following output.

```
<Quidway>
```

Now, you can configure the switch.

Note:

Quidway series switch provides a variety of command modes. For the specific description on the configuration command and command line interface, see *Quidway S3500 Series Ethernet Switches Operation Manual*.

Chapter 6 BootROM and Host Software Loading

6.1 Introduction to Loading Approaches

This chapter introduces how to load BootROM and host software for a switch at the local and the remote.

You can load the software at the remote using:

- FTP
- TFTP

You can load the software at the local using:

- XModem via Console port
- TFTP via Ethernet port
- FTP via Ethernet port

Note:

Please note that the BootROM version should be compatible with the host software version when BootROM and host software are being loaded.

6.2 Local Software Loading

If your terminal is directly connected to the switch, you can load BootROM and host software at the local.

Before proceeding to load the software, make sure that your terminal is correctly connected to the switch.

Note:

The steps that you should take to load BootROM program and host software are the same, except that in a BootROM program loading process you need to press <Ctrl +U> after accessing the BootROM menu and will view a different prompt message. BootROM loading steps are described below as an example.

6.2.1 Boot Menu

After being powered on, the switch runs the BootROM program first and displays the following information on the screen:

```
starting….
            ********************************************
            *                                          *
            *   Quidway S3526 BOOTROM, Version 2.00    *
            *                                          *
            ********************************************
      Copyright(C) 2000-2002 by HUAWEI TECHNOLOGIES CO.,LTD.
      Creation date: Oct 26 2001, 16:57:31
      CPU type        : MPC8240
      CPU Clock Speed : 200Mhz
      BUS Clock Speed : 33Mhz
      Memory Size     : 64MB

S3526R001 main board self testing.....................
SDRAM fast selftest.................................OK!
Please check port leds.............Led selftest finished!
Flash fast selftest.................................OK!
Switch chip selftest................................OK!
CPLD selftest.......................................OK!
Port g2/1 has no module
Port g1/1 has no module
PHY selftest........................................OK!
SSRAM fast selftest.................................OK!

Press Ctrl-B to enter Boot Menu... 5
```

Press <Ctrl+B>. The system displays:

```
Password :
```

Note:

To access the Boot Menu, you should press <Ctrl+B> within five seconds after the information “Press Ctrl-B to enter Boot Menu...” appears; otherwise the system will start to decompress the program. At this time if you want to access the Boot Menu, you will have to restart the switch.

Input the correct BootROM password (by default, no password is set on the switch). The system enters the following Boot Menu:

Caution:

Please remember the BootROM password you have modified when using the switch.

```
          BOOT  MENU
1. Download application file to flash
2. Select application file to boot
3. Display all files in flash
4. Delete file from flash
5. Modify bootrom password
0. Reboot
Enter your choice(0-5):
```

6.2.2 Loading Software from Console Port Using XModem

I. Introduction to XModem

XModem is a file transfer protocol widely used due to its simplicity and good functions. XModem transfers files via Console port, supporting data packets of 128 bytes and 1KB. With respect to reliability, it supports checksum, CRC, and error packet retransmission mechanism. Normally, the maximum number of retransmission attempts is ten.

XModem transmission is completed by receiving program and sending program. Receiving program initiates packet checking method negotiation by sending the negotiation character. If the negotiation passes, sending program starts packet transmission. Upon the receipt of a complete packet, the receiving program checks it using the agreed-upon check method. If the check succeeds, the receiving program sends an acknowledgement character; if the check fails, it sends a reject character. Upon the receipt of the acknowledgement, the sending program continues to send the next packet; upon the receipt of the reject, it retransmits the packet.

II. Loading BootROM

Follow these steps to download the BootROM program:

Step 1: Press <Ctrl + U> in the Boot Menu displayed in the section “6.2.1 Boot Menu” to access the BootROM loading menu shown below:

```
Enter your choice(0-5):

Please set bootrom download protocol parameter:

1. Set TFTP protocol parameter
```

```
2. Set FTP protocol parameter
3. Set XMODEM protocol parameter
0. Return to boot menu
```

Step 2: Press <3> in the loading menu, choosing to download the BootROM program using XModem. Press <Enter>. The system displays the following download speed setting menu:

```
Please select your download baudrate:
1. 9600
2. 19200
3. 38400
4. 57600
5. 115200*
0. Return
Enter your choice (0-5):5
```

Step 3: Choose an appropriate download baud rate. Press <5> in the above example to choose the baud rate of 115200bit/s. Press <Enter>. The system displays the following information:

```
Are you sure to update your bootrom?(Y/N)
```

Step 4: The system begins to download if you press <Y>; it returns to download menu if you press <N>. If you press <Y> and <Enter>, the system displays the following information:

```
Download baudrate is 115200 bps.
Please change the terminal's baudrate to 115200 bps and select XMODEM protocol.
Press enter key when ready.
```

Note:

You do not need to modify the HyperTerminal's baud rate if you have chosen 9600 bps, and thus can skip Steps 5 and 6 and proceed to Step 7 directly. At this time, the system will not display the above information.

Step 5: Enter HyperTerminal's [File/Properties] menu, click <Configuration> in the popup dialog box, select the baud rate of 115200bps in the "Console Port Configuration" dialog box.

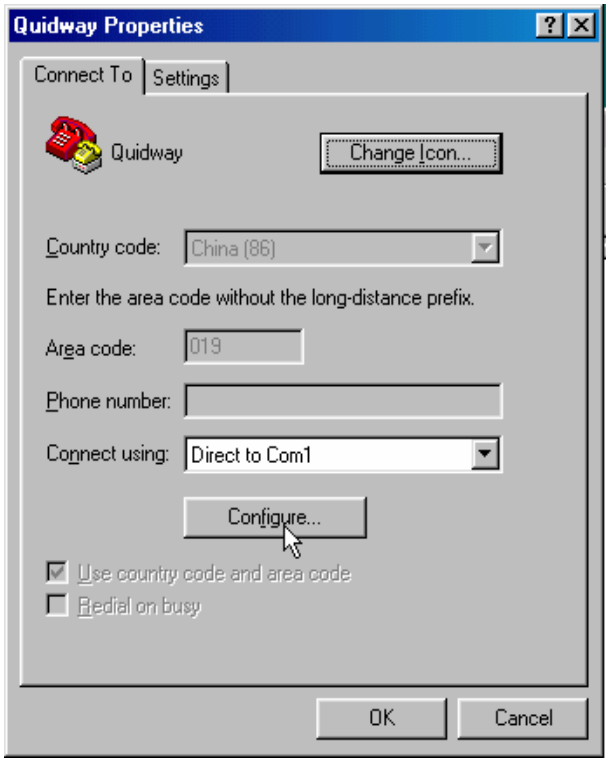


Figure 6-1 “Properties” dialog box

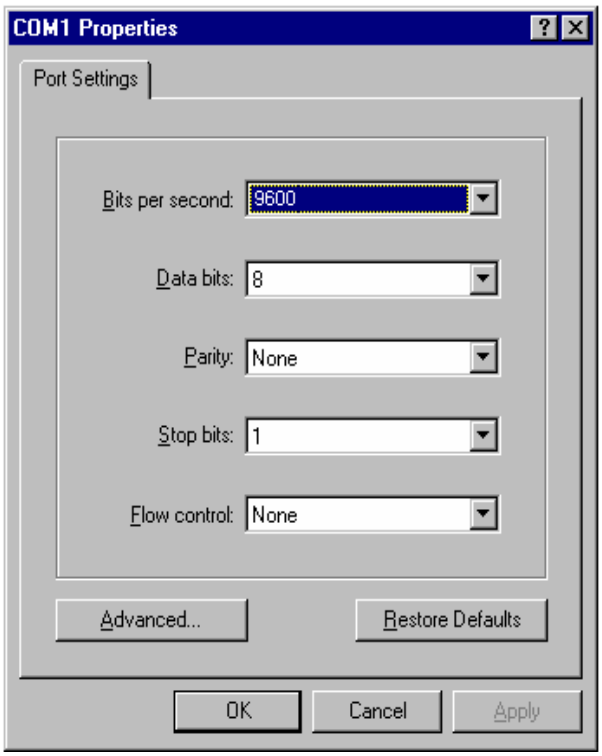


Figure 6-2 “Console Port Configuration” dialog box

Step 6: Click <Disconnect> to disconnect the HyperTerminal from the switch and then click <Connect> to re-establish the connection, thus validating the baud rate setting.

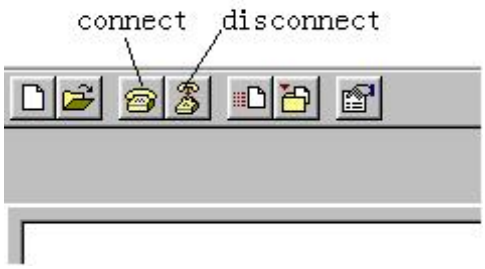


Figure 6-3 <Disconnect> and <Connect>

Note:

After changing terminal's baud rate, you must disconnect and connect the terminal emulation program to validate the new configuration.

Step 7: Press <Enter> to start program loading. The system displays the following information:

```
Now please start transfer file with XMODEM protocol.
If you want to exit, Press <Ctrl+X>.
Loading ...CCCCCCCCCC
```

Step 8: Select [Transfer/Send File] in the HyperTerminal's window, and in the popup dialog box similar to the following figure click <Browse>, select the software you need to download, and set the protocol to XModem.

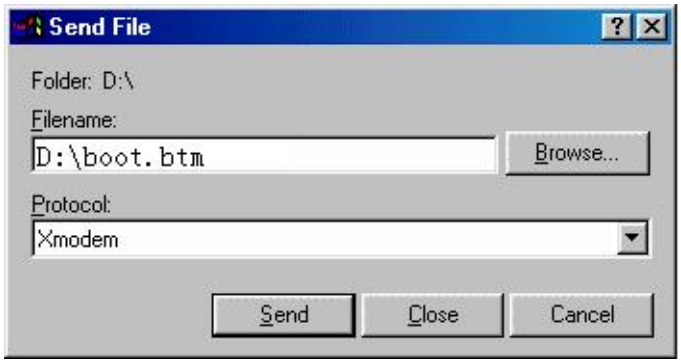


Figure 6-4 "Send File" dialog box

Step 9: Click <Send>. The system displays the following interface.

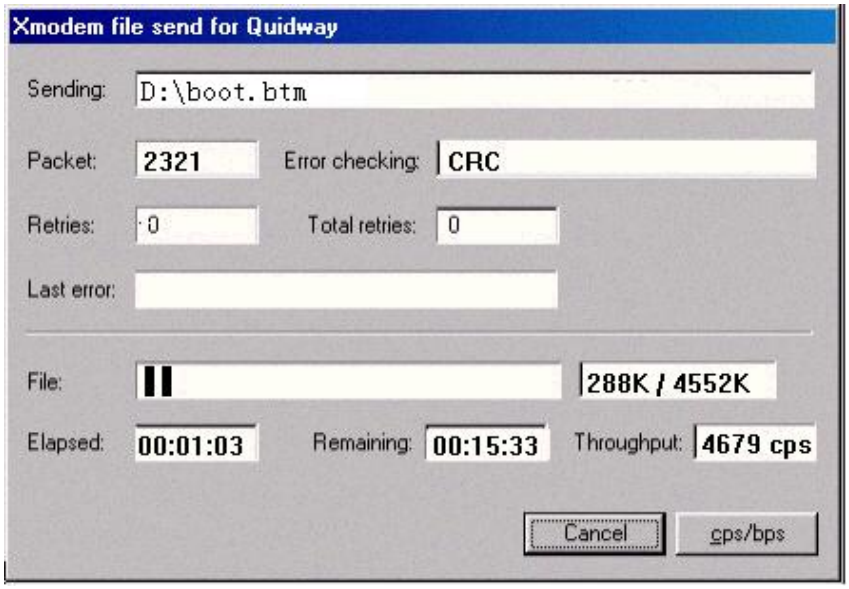


Figure 6-5 "Sending File" Interface

After completing the loading, the system displays the following information:

```
Loading ...CCCCCCCCCC done!
## Total Size      = 0x00055d40 = 351552 Bytes
Your baudrate should be set to 9600 bps again!
Press enter key when ready.
```

Note:

You do not need to reset the HyperTerminal's baud rate and can skip the last step if you have chosen 9600 bps. In this case, the system does not display the above prompt message but "BootROM is updating now.....done!" instead.

Step 10: Reset HyperTerminal's baud rate to 9600bps with reference to Steps 5 and 6 described above. Then, press any key as prompted. The system will display the following information when it completes the loading.

```
Bootrom is updating now.....................................done!
```

III. Loading host software

Follow these steps to download the host software of the switch:

Step 1: Select <1> in Boot Menu. The system displays the following information:

```
1. Set TFTP protocol parameter
2. Set FTP protocol parameter
3. Set XMODEM protocol parameter
```

```
0. Return to boot menu←
Enter your choice(0-3):3
```

The subsequent steps and those of loading BootROM are the same, except of the prompt messages.

6.2.3 Loading Software from Ethernet Port Using TFTP

I. Introduction to TFTP

Trivial File Transfer Protocol is a TCP/IP protocol used for file transmission between clients and servers. It uses UDP to provide unreliable data stream transfer service.

II. Loading BootROM

Step 1: Select an Ethernet port on the switch for loading and connect it to the PC storing the files to be downloaded. (You should know PC's IP address). Besides, connect the switch to an external PC via Console port. This PC can be the same one storing the files to be downloaded.

Step 2: Run the TFTP Server program on the PC connected to the Ethernet port, and specify the path for program loading.

⚠ **Caution:**

TFTP Server program is not provided with the Quidway Series Switches.

Step 3: Run terminal emulation program on the PC that is connected to the Console port. Start the switch, access Boot Menu, and then enter download protocol menu.

To download the BootROM program, press <Ctrl + U> to access the menu for BootROM downloading when the system displays: "Enter your choice(0-5):"

```
Enter your choice(0-5):

Please set bootrom download protocol parameter:

1. Set TFTP protocol parameter
2. Set FTP protocol parameter
3. Set XMODEM protocol parameter
0. Return to boot menu
```

Step 4: In the download protocol menu, press <1>to select TFTP protocol to download BootROM or host software. Press <Enter>. The system displays the following information:

```
Load File name
Switch IP address ←(This address and the IP address of the PC storing the files to be downloaded must be on the same network segment)
Server IP address
```

Step 5: Input the TFTP parameter values and press <Enter>. The system displays the following information:

```
Are you sure to update your bootrom?(Y/N)
```

Step 6: Press <Y> to start file downloading and <N> to return to the program downloading menu. Suppose you press <Y> and then <Enter>. The system starts BootROM program downloading and upon its completion automatically starts BootROM loading. The system displays the following information upon the completion of the entire process:

```
Initializing net....done!
Loading.........................done!
Bootrom is updating now.....................................done!
```

III. Loading host software

Follow these steps to download the host software of the switch.

Step 1: Select <1> in Boot Menu. The system displays the following information:

```
1. Set TFTP protocol parameter
2. Set FTP protocol parameter
3. Set XMODEM protocol parameter
0. Return to boot menu
Enter your choice(0-3):1
```

Select <1>. The subsequent steps and those of loading BootROM are the same, except of the displayed prompt messages.

6.2.4 Loading Software from Ethernet Port Using FTP

I. Introduction to FTP

A switch can be used via Ethernet port as an FTP server or a client to provide another approach for software loading and file configuration. An example of a switch being used as an FTP client is given below.

II. Loading BootROM

Step 1: Select an Ethernet port on the switch for loading and connect it to the PC storing the files to be downloaded. (You should know PC's IP address). Besides, connect the switch to an external PC via Console port. This PC can be the same one storing the files to be downloaded.

Step 2: Run the FTP Server program on the PC that is connected to the Ethernet port, and specify the path for program loading.

Step 3: Run terminal emulation program on the PC connected to the Console port. Start the switch, access Boot Menu, and then enter download protocol menu.

To download the BootROM program, press <Ctrl + U> to access the menu for BootROM downloading when the system displays: "Enter your choice (0-5):"

```
Enter your choice(0-5):

Please set bootrom download protocol parameter:

1. Set TFTP protocol parameter
2. Set FTP protocol parameter
3. Set XMODEM protocol parameter
0. Return to boot menu
```

Step 4: In the download protocol menu, press <2> to select FTP protocol to download BootROM and host software. Press <Enter>. The system displays the following information:

```
Load File name
Switch IP address ←(That address is in the same network segment as the server IP address)
Server IP address
FTP User Name    ←It must be the same one set on FTP Server
FTP User Password ←It must be the same one set on FTP Server
```

Step 5: Input the FTP parameter values and press <Enter>. The system displays the following information:

```
Are you sure to update your bootrom?(Y/N)
```

Step 6: Press <Y> to start file downloading and <N> to return to the program downloading menu. Suppose you press <Y> and then <Enter>. The system starts program downloading and upon its completion, starts writing to Flash. The system displays the following information after completing the writing operation:

```
Initializing net....done!
Loading.........................done!
Bootrom is updating now.....................................done!
```

III. Loading host software

Follow these steps to download the host software:

Step 1: Select <1> in Boot Menu. The system displays the following information:

```
1. Set TFTP protocol parameter
2. Set FTP protocol parameter
3. Set XMODEM protocol parameter
0. Return to boot menu
Enter your choice(0-3):3
```

You can select a different protocol to download host software.

The subsequent steps are the same as the steps taken to load the BootROM program, except for the displayed prompt messages.

6.3 Remote Software Loading

If your terminal is connected to the switch by a network, you can load BootROM and host software at the remote.

6.3.1 Remote Loading Using FTP

Run FTP Server on a local PC, provided you have configured username and password and have set the correct file directory. Suppose IP address of the PC is 10.10.110.1. Log onto the switch via Telnet to send host program to the switch using FTP.

Provided that the host program is SWITCH.app and the BootROM program is SWITCH.btm, you can follow these steps after logging onto the switch by using Telnet.

Step 1: Download the software to the switch using FTP.

<Quidway> ftp 10.10.110.1

```
Trying ...
Press CTRL+K to abort
Connected.
220 WFTPD 2.0 service (by Texas Imperial Software) ready for new user
User(none):lyt
331 Give me your password, please
Password:
230 Logged in successfully
```

[ftp] get SWITCH.app SWITCH.app

[ftp] get SWITCH.btm SWITCH.btm

[ftp] bye

Step 2: Load BootROM.

<Quidway> boot bootrom SWITCH.btm

```
please wait ...
Bootrom is updated!
```

Step 3: Load the host software.

<Quidway> boot boot-loader SWITCH.app

<Quidway> display boot-loader

```
The app to boot at the next time is: flash:/SWITCH.app
```

<Quidway> reboot (Please make sure that you have saved other configurations before rebooting, otherwise, they might not survive a reboot.)

BootROM and host software loading is completed now. Please note that you must reboot the switch to validate host software downloading. If Flash memory space is not enough, you can delete some of the program files in Flash after completing the BootROM loading. (You are recommended to delete the host program that is no longer in use.) Then upload the host program to the switch using FTP. Please note that power-off must be prevented during loading process.

6.3.2 Remote Loading Using TFTP

Using TFTP is similar to using FTP in remote loading. The only difference is that it is TFTP that you use when loading software to the switch. In this case, the switch can only be used as a TFTP client to download the software to its Flash memory from the TFTP server. The remaining steps after downloading are the same as those of remote loading using FTP.

6.4 Dealing with Load Failure

If loading fails, the original version will remain in the system.

In this case, check that the physical ports are correctly and well connected. If they are not, reconnect them correctly and restart loading procedures.

If there are no problems with the physical connections, please carefully check information about the loading procedures for input errors on the HyperTerminal.

1) When using XModem, check that you have reset the baud rate of the HyperTerminal to 9600bps after loading the software with a baud rate other than 9600 bps;
2) When using TFTP, check that you have provided:

- Correct server and switch IP addresses;
- Correct name of the software to be loaded;

- Correct path for TFTP Server to operate on program files.

3) When using FTP, check that you have provided:

- Correct server and switch IP addresses;
- Correct name of the software to be loaded;
- Correct username and password.

If loading fails when there are neither physical connection problems nor input errors, please contact the local agents of Huawei Technologies Co., Ltd. for help.

6.5 Dealing with Missing of Password

Please contact the local agent of Huawei Technologies Co., Ltd. if the BootROM password or user password of the switch is lost.

Chapter 7 Troubleshooting

7.1 Power System Failure

You can check and verify whether power system of S3526 switch has failed by observing the power indicators on the front panel. The POWER indicator is always on when the system is normal; if the indicator is off, please check that:

- Whether the switch power cords are correctly connected.
- Whether the power input to the switch matches the requirement as labeled on the switch.

7.2 Configuration System Failure

After the switch is powered on and the system is normal, the booting information will be displayed on the configuration terminal. If the configuration system has any fault, there will not be any screen display at the configuration terminal or the displayed characters will be totally illegible.

I. Troubleshooting when there is no terminal display

If there is no output information after the configuration is powered on, please check that:

- whether the power supply is normal
- whether the console cables are connected correctly

If no problems are found after the above-mentioned items have been checked, the cause may lie in the console cable or the setting of the terminal (such as HyperTerminal) parameters. Please perform the corresponding check.

II. Troubleshooting when the terminal display is illegible

If the configuration terminal display is illegible, the cause might lie in the parameter setting error at the terminal (such as HyperTerminal).

Please confirm the parameter setting at the terminal (such as HyperTerminal): set the baud rate to 9,600, data bit to 8, parity check to none, stop bit to 1 and flow control to none. Select the terminal emulation as VT100.

Chapter 8 Optional Interface Modules

Warning:

Before performing installation and removal of optional interface module, please make sure that the switch is powered off to avoid damage to the components.

8.1 Types of Optional Interface Modules

S3526 Ethernet Switch provides the following types of optional interface modules.

- 1000Base-SX module
- 1000Base-LX module
- 1000Base-T module
- 1000Base-ZX module
- 1000Base-LX module
- stack module

8.2 Installation of the Optional Modules

For the description of the function module Installation, please refer to Chapter 3 .

I. Installation Tools

- Flat-blade screw-driver
- ESD-preventive wrist strap

II. Installation

Warning:

Before performing any of the following operation, please make sure that the switch is powered off to avoid damage to the components.

Step 1: Wear ESD-preventive wrist strap to disconnect the power of the switch.

Note:

S3526 Ethernet Switch with AC power input is not shipped with power switch. Please directly turn off the switch of the external power supply when the power-off is required.

Step 2: Place the switch on a surface, with its rear panel forward.

Step 3: Hold the interface card of the function module. Vertically align the edge of the interface card with that of the rear panel of the switch chassis.

Step 4: Slide the interface card into the switch until the card touches the switch rear panel.

Step 5: Fix the interface card on the switch with the captive screw on the card of the function module.

III. Removal

Step 1: Wear ESD-preventive wrist strap to disconnect the power of the switch.

Step 2: Place the switch on a surface, with its rear panel forward.

Step 3: Use a flat-blade screwdriver to unscrew the captive screws on the both sides of the optional interface module.

Step 4: Unseat the interface card in the direction towards the operator until the interface card disengages from the switch.

Note:

When removing the optional interface modules, please pay attention to the following:
1) When removing /installing the module, do not apply too much force during the operation or touch the components on the surface of the module.
2) If the module is removed and there is no need to mount new module, please mount a blank panel in time to keep aside the dust and ensure the ventilation of the switch.

8.3 1000Base-SX/LX Module

8.3.1 Introduction

1000Base-SX module provides one GE multi-mode optical interface.

1000Base-LX module provides one GE single-mode optical interface.

1000Base-SX/LX module interface supports GE full duplex mode.

Table 8-1 Interface attributes of 1000Base-SX/LX module

Attribute	Description	
	1000Base-LX module	1000Base-SX module
Type of connector	SC	
Number of the interfaces	1	
Cable and transmission distance	10km transmission distance when 9/125μm single mode optical fiber is selected. 550m transmission distance when 62.5/125μm multi-mode optical fiber is selected. 550m transmission distance when 50/125μm multi-mode optical fiber is selected.	220m transmission distance when 62.5/125μm multi-mode optical fiber is selected. 500m transmission distance when 50/125μm multi-mode optical fiber is selected.
Compliant standard	IEEE 802.3 z	
Central wavelength	1300nm	850nm
Transmitting optical power	>9.5dBm	
Receiving sensitivity	-20dBm	-17dBm

Note:

When connecting the optical fiber, please pay attention to the following:

1) Do not bend the fiber optic excessively.

2) Do not wrongly connect the Tx end and the Rx end of the fiber optic.

3) Ensure cleanness at the interface of the fiber optic.

8.3.2 Appearance

1000Base-SX module and 1000Base-LX module are similar in their appearance. 1000Base-SX module is displayed below as an example.

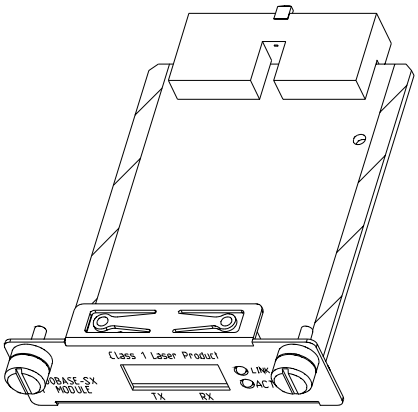


Table 8-2 1000Base-SX module

8.3.3 Module Panel and the Indicators

1000Base-SX module panel is illustrated in the following figure.

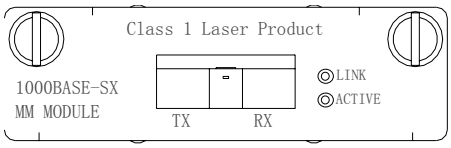


Figure 8-1 1000Base-SX module panel

The description of the panel indicators is given in the following table.

Table 8-3 Meaning of indicators on 1000Base-SX module panel

Indicator	State
LINK	Off means the line is not connected. On means the line is connected.
ACTIVE	Off means no data is being received or sent. Blinking means there is data being received and transmitted.

8.4 1000Base-T Module

8.4.1 Introduction

1000Base-T module provides the user with one 1000Base-T interface. The interface can operate in full duplex mode, and

- Support MDI/MDI-X auto sensing
- In full compliance with IEEE 802.3ab and 1000Base-T.

Table 8-4 Interface attributes of 1000Base-T module

Attribute	Description
Type of connector	RJ-45
Functions	● 1000Mbps full duplex ● MDI/MDI-X auto sensing
Cable and transmission distance	● 100m transmission distance when Category-5 twisted pair is selected.

Note:

For the appearance of RJ-45 connector and the related description about MDI/MDI-X, see appendix A.

8.4.2 Appearance

1000Base-T module is illustrated in the following figure.

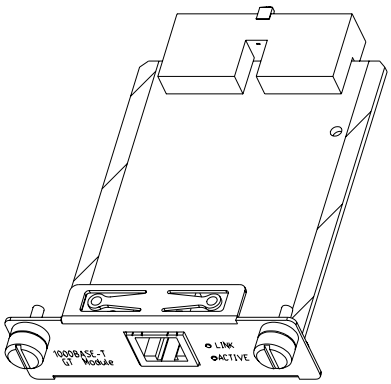


Figure 8-2 1000Base-T module

8.4.3 Module Panel and the Indicators

1000Base-T module panel is illustrated in the following figure.

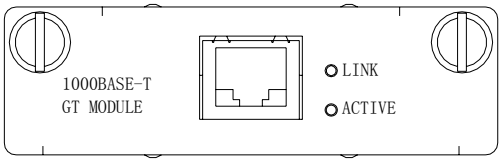


Figure 8-3 1000Base-T module panel

The description of the panel indicators is given in the following table.

Table 8-5 Meaning of indicators on 1000Base-T module panel

Indicator	State
LINK	Off means the line is not connected. On means the line is connected.
ACTIVE	Off means no data is being received or sent. Blinking means there is data being received and transmitted.

8.5 1000Base-ZX Module

8.5.1 Introduction

1000Base-ZX module provides one GE optical interface and uses single-mode fiber for transmission within 70km.

Table 8-6 Interface attributes of 1000Base-ZX module

Attribute	Description
Type of connector	LC
Number of the interfaces	1
Cable and transmission distance	10km transmission distance when 9/125μm single mode optical fiber is selected.
Compliant standard	IEEE 802.3 z
Central wavelength	1550nm
Transmitting optical power	-3.0dBm to 2.0dBm
Receiving sensitivity	-23dBm

8.5.2 Appearance

1000Base-ZX module panel is illustrated in the following figure.

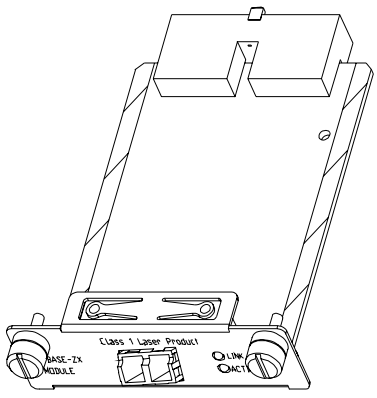


Figure 8-4 1000Base-ZX module

8.5.3 Module Panel and the Indicators

1000Base-ZX module panel is illustrated in the following figure.

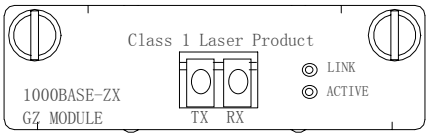


Figure 8-5 1000Base-ZX module panel

The description of the panel indicators is given in the following table.

Table 8-7 Meaning of indicators on 1000Base-ZX module panel

Indicator	State
LINK	Off means the line is not connected. On means the line is connected.
ACTIVE	Off means no data is being received or sent. Blinking means there is data being received and transmitted.

8.6 1000Base-LX GL Module

8.6.1 Introduction

1000Base-LX GL module provides a Gigabit optical interface and uses single-mode fiber for transmission within 40km.

Table 8-8 Interface attributes of 1000Base-LX GL module

Attribute	Description
Type of connector	LC
Number of the interfaces	1
Cable and transmission distance	40km transmission distance when 9/125μm single mode optical fiber is selected.
Compliant standard	IEEE 802.3 z
Central wavelength	1550nm
Transmitting optical power	-5.0dBm to 0dBm
Receiving sensitivity	-21dBm

8.6.2 Appearance

1000Base-LX GL module panel is illustrated in the following figure.

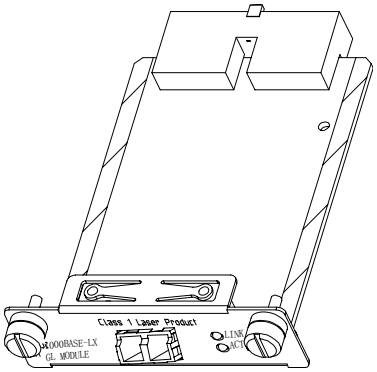


Figure 8-6 1000Base-LX GL module

8.6.3 Module Panel and the Indicators

1000Base-LX GL module panel is illustrated in the following figure.

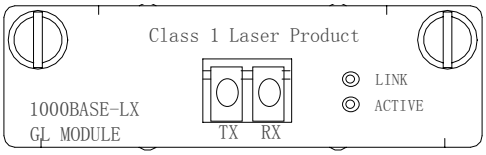


Figure 8-7 1000Base-LX GL module panel

The description of the panel indicators is given in the following table.

Table 8-9 Meaning of indicators on 1000Base-LX GL module panel

Indicator	State
LINK	Off means the line is not connected. On means the line is connected.
ACTIVE	Off means no data is being received or sent. Blinking means there is data being received and transmitted.

8.7 Stack Module

8.7.1 Introduction

S3526 Ethernet Switch can be connected with any switch installed with stack module to form a stack via the dedicated stack module and stack port cable. All the devices in the stack will be considered as one device in actual application.

Table 8-10 Interface attributes of stack module

Attribute	Description
Type of connector	Specially designed connector
Number of interfaces	1
Functions	1000M full duplex
Cable and transmission distance	Stack cable with the length of 1m.

8.7.2 Appearance

The stack module is illustrated in the following figure.

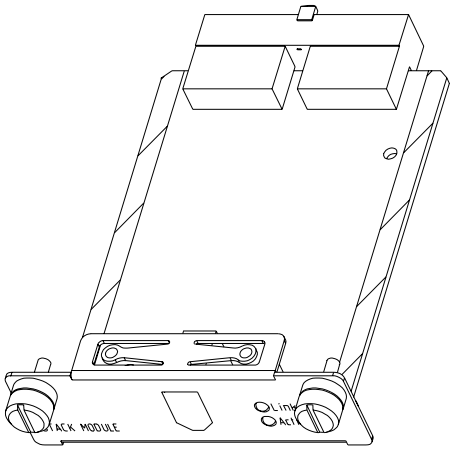


Figure 8-8 Stack module

8.7.3 Module Panel and the Indicators

Stack module panel is illustrated in the following figure.

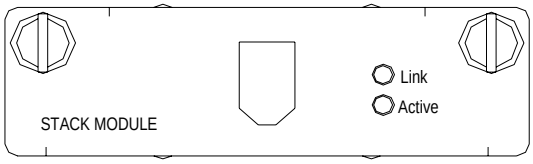


Figure 8-9 Stack module panel

The description of the panel indicators is given in the following table.

Table 8-11 Meaning of indicators on stack module panel

Indicator	State
Link	Off means the line is not connected. On means the line is connected.
Active	Off means no data is being received or sent. Blinking means there is data being received and transmitted.

8.7.4 Connection of Module Interface Cable

I. Interface cable for stack module

The interface cable for stack module is a type of dedicated cable, which is one meter long.

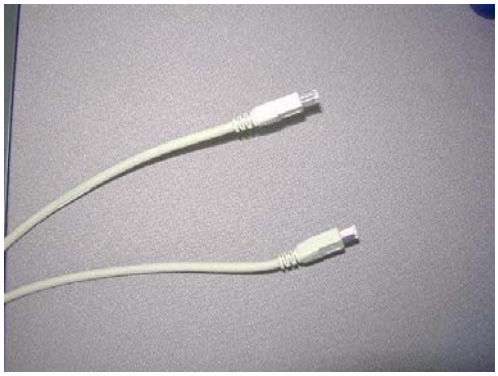


Figure 8-10 Stack cable

Note:

The stack cable supports hot swapping.

II. Connection of stack cable

Step 1: Insert the stack cable into the stack ports of the two switches to be stacked.

Step 2: Check the link indicator on the stack modules of the switch. If the indicator is on, it indicates that the connection is correct.

Appendix A Knowledge of Optical Fiber

The center of optical fiber is a light transmission glass core, clad by a glass packet with lower refractive index so to keep the optical fiber within the core. Outside, there is a thin plastic shield to protect the packet. Usually, optical fibers are packed into bundles and are protected by a casing. The application field of optical fibers is increasingly wide due to the extremely high reliability, transmitting quality and the constant adoption of new technologies in optical fiber design and manufacturing.

A.1 Multi-mode Optical Fiber and Single Mode Optical Fiber

The optical fiber system can be divided into two categories, Multi-mode fiber and Single mode fiber, according to the light transmitting modes.

Cores of Single mode optical fibers are very small. As a result, only a Single mode can be used to transmit in a specified wavelength. The transmitting frequency bandwidth is wide and the transmitting capacity is enormous.

Multi-mode optical fibers are fibers for Multi-mode transmissions in a specified wavelength. In Multi-mode transmission, different speeds of the lights in different modes can cause phase errors that will lead to the transmission distortion. Therefore, their transmission frequency is limited. There are two Multi-optical fiber systems, i.e. 62.5μm (fiber measurement) and 50μm. Both systems are approved transmission medium in ISO/IEC 11801 standards.

A.2 Optical Fiber Connector

ITU recommends to define it as "Used to connect passive components of two or several optical fibers steadily but not permanently" (pass by the VI research team of CCITT in March, 1992 in Geneva).

Optical fiber connectors are indispensable passive components in optical fiber communication system. Their application enables the removable connection between light path.

There are various optical fiber connectors. Here, only MT-RJ, SC, and LC will be introduced.

- MT-RJ: This type of connectors converge two channels of optical sources into single optical fiber, and hence reduces the number of ports for connectors.

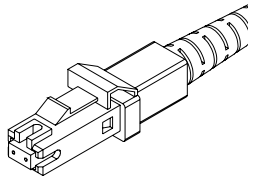


Figure A-1 MT-RJ connector

- SC connector

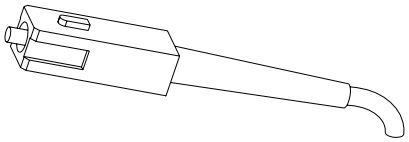


Figure A-2 SC connector

- LC connector

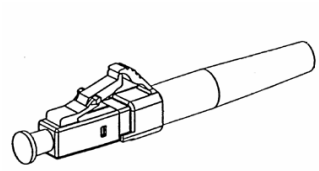


Figure A-3 LC connector

Appendix B RJ-45 Connector

S3526 Ethernet Switch adopts RJ-45 connectors for the 10Base-T/100Base-TX and 1000Base-T interfaces.

Figure B-1 illustrates the appearance of RJ-45 connector and the pinout arrangement.

- Table B-1 lists the electrical property RJ-45 connector pinout in MDI mode.
- Table B-2 lists the electrical property RJ-45 connector pinout in MDI-X mode.

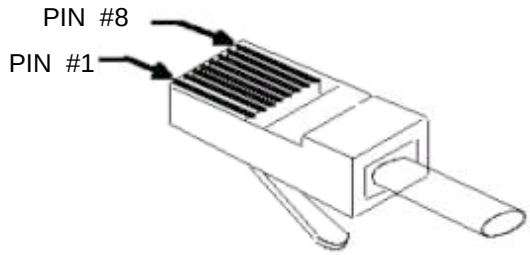


Figure B-1 RJ-45 connector

Table B-1 RJ-45 MDI interface pinout assignment

Pinout	10Base-T/100Base-TX		1000Base-T	
	Signal	Function	Signal	Function
1	Tx+	Send data	BIDA+	Bi-directional data wire A+
2	Tx-	Send data	BIDA-	Bi-directional data wire A-
3	Rx+	Receive data	BIDB+	Bi-directional data wire B+
4	Reserved	-	BIDC+	Bi-directional data wire C+
5	Reserved	-	BIDC-	Bi-directional data wire C-
6	Rx-	Receive data	BIDB-	Bi-directional data wire B-
7	Reserved	-	BIDD+	Bi-directional data wire D+
8	Reserved	-	BIDD-	Bi-directional data wire D-

Note:

Tx = Send data

Rx = Receive data

BI = Bi-directional data

Table B-2 RJ-45 MDI-X interface pinout assignment

Pinout	10Base-T/100Base-TX		1000Base-T	
	Signal	Function	Signal	Function
1	Rx+	Receive data	BIDB+	Bi-directional data wire B+
2	Rx-	Receive data	BIDB-	Bi-directional data wire B-
3	Tx+	Send data	BIDA+	Bi-directional data wire A+
4	Reserved	-	BIDD+	Bi-directional data wire D+
5	Reserved	-	BIDD-	Bi-directional data wire D-
6	Tx-	Send data	BIDA-	Bi-directional data wire A-
7	Reserved	-	BIDC+	Bi-directional data wire C+
8	Reserved	-	BIDC-	Bi-directional data wire C-

Appendix C Lightning Protection of Switches

C.1 Installation of Lightning Arrester for Power (Socket Strip with Lightning Protection)

Caution:

Lightning arrester will not be shipped with the equipment. You should purchase it by yourself as needed.

When an AC power cord outdoor is led in to directly connect to the power socket on the switch, the AC power socket should be connected to the socket strip (with lightning protection) for preventing the switch from lightning strike. You can use cable clip and screws to fasten the socket strip (with lightning protection) on the cabinet, workbench or the wall of equipment room. After powering on, alternating current will pass through the socket strip (with lightning protection) before entering the switch.

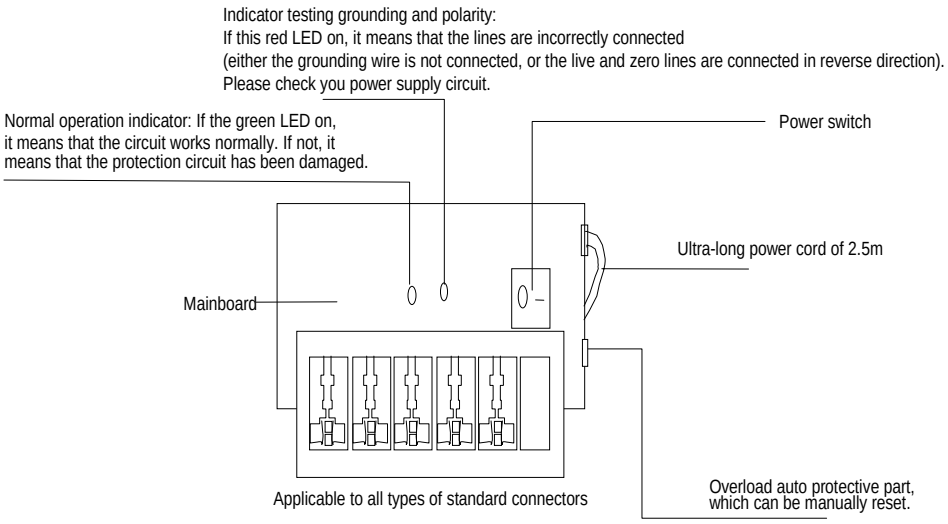

Indicator testing grounding and polarity:
If this red LED on, it means that the lines are incorrectly connected
(either the grounding wire is not connected, or the live and zero lines are connected in reverse direction).
Please check you power supply circuit.
Normal operation indicator: If the green LED on,
it means that the circuit works normally. If not, it
means that the protection circuit has been damaged.
Power switch
Ultra-long power cord of 2.5m
Mainboard
Applicable to all types of standard connectors
Overload auto protective part,
which can be manually reset.

Figure C-1 Lightning arrester for power

Caution:

1) Make sure that the PE terminal is well grounded before using the lightning arrester for power.
2) Insert the AC power plug of switch into the socket of lightning arrester for power (socket strip with lightning protection). If the green LED is on and the red LED does not alarm, it means that the lightning arrester of power is running and the function of lightning protection has taken effect.
3) Pay adequate attention if the red LED alarms. You should correctly locate the problem, whether it is caused because the ground wire is not well grounded or because the live and zero lines are connected in reverse direction. You may check that in the following way. Use a multimeter to examine polarity at the power socket of lightning arrester. If the zero line is on the left and the live line on the right, it means that the lightning arrester is connected to AC socket in reverse polarity. In this case, you should open the lightning arrester for power to correct connection polarity. If the red LED still alarms, it means that PE is not grounded yet, and you should check the AC power socket again for sure.

C.2 Installation of Lightning Arrester for Network Port

Note:

Lightning arrester for network port is specially designed for the Ethernet port of 10/100M electrical interface (RJ-45 connector is adopted in this case).

Caution:

Lightning arrester for network port will not be provided along with the equipment, and you should purchase it by yourself as needed.

If an outdoor network cable should be led into the switch, please serially connect the lightning arrester for network port before you plug this cable into the interface on the switch, in case of the possibility that the switch may be damaged due to lightning strike.

I. Required tools

- Phillips screwdriver or Flat-blade screwdriver
- Multimeter
- Tilted wire cutter

II. Installation procedure

Step 1: Tear the protection paper at one side of the double faced adhesive tape apart from the tape, and stick the tape on the surface of the lightning arrester for network port. Tear the protection paper at another side apart from the tape, and stick the lightning arrester onto the chassis of the switch. The lightning arrester should be attached on the chassis as close to the grounding screw as possible.

Step 2: According to the distance of the grounding screw, cut the ground wire of the lightning arrester, and securely tightening the ground wire around the grounding screw.

Step 3: Use the multimeter to measure whether the ground wire of the arrester contacts well with the grounding screw and chassis.

Step 4: According to the instruction of lightning arrester for network interface, connect the arrester with the network interface conversion cables (Be carefully with the direction. External cable should be inserted into the IN end, and the conversion cable connected to the switch should be inserted into the OUT end). When you do that, observe whether the card indicators normally display.

Note:

The instruction of lightning arrester for network interface contains the technical specifications, installation and maintenance of the arrester. Please carefully read it before installing the arrester.

Step 5: Use the nylon ties to bundle the cables neatly.

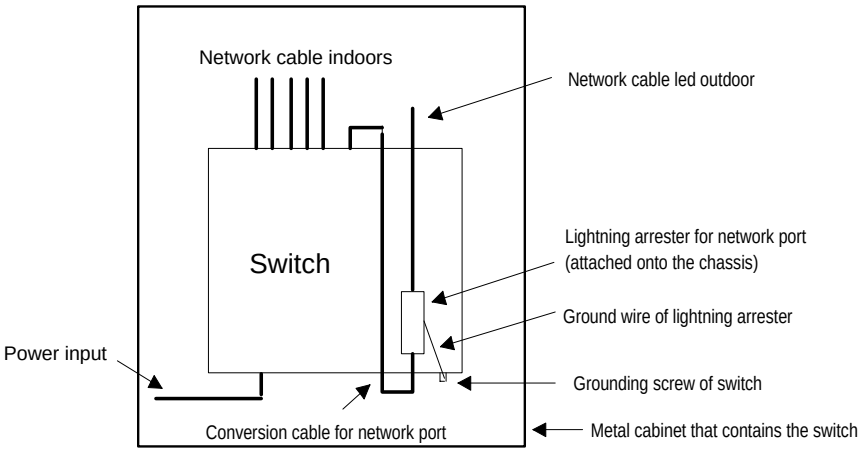


Figure C-2 Installation diagram of lightning arrester for network port

III. Installation precautions

Fully consider the following items in the installation process, otherwise, the performance of the lightning arrester for network interface will be affected:

- Lightning arrester for network interface is installed in reverse direction. In practice, the “IN” end should be connected to the external cable and the “OUT” end to the network interface on the switch.
- Lightning arrester for the network interface is not well grounded. The ground wire for the arrester should be as short as possible, so to ensure its good contact with the grounding screw of the switch. After the connection, use the multimeter to confirm that.
- The lightning arrester for the network interface is not installed completely. If the switch has more than one network interfaces to interconnect other devices via cables outdoor, you should install lightning arresters for all these network interfaces for protection.